Spruce Budworm
Update and Frequently Asked Questions
June 25, 2015

Update

The spruce budworm has finished feeding on tree needles for the year in most areas. There are a few larvae still chewing on needles, but most have turned into pupae. In a week or two, small copper colored budworm moths will emerge and begin laying eggs. In areas that have been heavily hit for two or more years, many of the moths will migrate to new areas where there or more new spruce & fir needles on which to lay eggs. These eggs will "hatch" in a week or two depending on the weather. These tiny larvae will do no noticeable damage, and will overwinter. Next spring when the weather warms, they will become active. They will feed in newly expanding buds. As soon as these buds expand and shed their bud caps, the trees can be sprayed to protect them from being defoliated. Check your trees in late-May to early-June to see if there are small budworm larvae.

We have begun mapping budworm impacted areas from the air. It initially appears that this year's hardest hit areas are in the Western Upper Peninsula south of an east west line bounded on the north by the Lake Michigamme Area on the east by M-41 between Marquette and Rapid River. Eastern Mackinac and Chippewa counties east of the Hiawatha National Forest also had impacted areas. The Southeast Northern Lower Peninsula also reported areas of heavy defoliation.

Background

The spruce budworm (SBW) *(Choristoneura fumiferana)* is one of the most destructive native insects in the northern spruce and fir forests of the Eastern United States and Canada. Periodic outbreaks of the spruce budworm are a part of the natural cycle of events associated with the maturing of balsam fir. It prefers balsam fir, but white and black spruces are also hosts with some feeding on tamarack, pine, and hemlock.

Since 1909 there have been waves of budworm outbreaks throughout the Eastern United States and Canada. The States most often affected are Maine, New Hampshire, New York, Michigan, Minnesota, and Wisconsin. These outbreaks last for 10-15 years and have resulted in the loss of millions of cords of spruce and fir.

The spruce budworm limits the longevity of balsam fir dominated and mixed spruce/fir forests in northeastern North America. The budworm larvae primarily defoliate balsam fir and white spruce. Every 30 to 50 years large scale SBW outbreaks cause widespread top kill and tree mortality. Mature and over mature balsam fir dominated stands are most severely damaged. Susceptible stands often lose 60 to 80 percent of the fir and 20 to 40 percent of the spruce. Mature fir stands may be entirely lost.

The last outbreak in Michigan started in the Upper Peninsula in the late 1960s and ended in the early 1980s. As a result of this outbreak, spruce and fir tree mortality was mapped on 519,000 acres in Michigan. Due to the extent and age of the spruce-fir resource and the fact that it has been about 40 years since the beginning of the last outbreak, another regional SBW epidemic is imminent.

Commonly Asked Questions

1. When should I spray to protect my spruce or fir trees?
    a. This year
        i. It's too late this year. The budworm is done feeding and pupae are not susceptible to sprays. Moths will disperse from many areas, so targeting moths is not effective.

    b. Next year
        i. If you have budworm larvae in the newly expanding spruce or fir shoots next late May or early June, spraying will protect your trees. You only need one application. Spray trees from top to bottom after new shoots have shed the bud caps and expanded so that needles are separate.

2. What spray should I use?
    a. Biological
        i. Pesticides with Bt are very effective. Bt only kills caterpillars like the budworm that feed on sprayed needles. Spraying caterpillars does not harm them because Bt has to be ingested to be effective.

    b. Chemical
        i. Most garden variety pesticides which target caterpillars are effective. Check the labels for insects targeted and spraying directions.

3. How will this defoliation affect my trees?
    a. Evaluating this year's damage. The budworm is a wasteful feeder, chewing needles off at the base and webbing them to the tree. When the needles brown all at once, trees appear very unhealthy. This may not be the case. Wait until later summer or early fall to evaluate tree health. Once brown needles are washed off by summer rains, green needles are easily seen. Trees with green canopy from the top down are still in pretty good shape. Trees with no needles on the canopy top are severely stressed. If the top turns white or silver, the tree most often dies.

    b. Landscape trees
        i. Young trees that are not under or next to older/taller spruce or fir trees are defoliated but seldom killed. Spraying is effective. If defoliated this year, adding an inch of water in one watering around the tree (if there is no rain) will help maintain tree vigor.

        ii. Trees older than 50-60 years are more vulnerable to defoliation damage. If budworm is detected, they should be sprayed to protect foliage.

c. Forested areas
    i. Aerially spraying forest land is expensive. Spraying isn't needed unless you have spruce/fir that is 50-60 years old or stressed by other factors such as poor soils. Poorly stocked stands with open grown trees are also more vulnerable to damage. If your spruce or fir resource is 50-60 years or older, you may have to spray it several times in the next decade to protect it if the budworm is active in your area.
    ii. Another alternative is to harvest your trees rather than losing them to the budworm. It's best to involve a professional forester in making this decision. If you decide to harvest, you should involve them in setting up your timber sale. They can insure that your property and residual trees are protected during harvest operations; that you get the best price for your trees; and, that the management objectives for your forestland are used in planning the harvest.

4. What is the state doing?
    a. Monitoring / educating
        i. We monitor the budworm development and map impacted areas. We then inform land managers and the public of expected impacts and possible remedies.

    b. Managing spruce and fir on forest lands to decrease vulnerability to damage
        i. Managing spruce/ fir resources to keep it under 60 years of age is recommended. This greatly reduces the vulnerability of the resource to these periodic budworm epidemics.

    c. Salvaging high-value impacted resources
        i. When a widespread epidemic occurs every 30-50 years, the DNR increases timber sale activity on state forest lands in high-value impacted areas. Much of the resource is on private ownership and on inaccessible sites, so these mature to over-mature spruce and fir are lost to the budworm. Whether the fiber is utilized (by the forest industry for pulp, paper and other products);, or the trees fall down, or they are burned by wildfires, the forest naturally regenerates to abundant balsam fir, white spruce and hardwoods such as aspen and red maple that may occur on site.

    d. The spruce budworm and wildlife values.
        i. As new forests regenerate beneath standing dead spruce and fir, bark-probing and cavity-nesting birds become much more abundant for 10-20 years. The number of birds, especially songbirds, often doubles. Many are non-insect feeding birds. This habitat is very good for rabbit, moose, deer, masked shrew and weasels.